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Reports of rationing from the neglected realm of capital investment: Responses to resource constraint in the English National Health Service

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ABSTRACT

Health systems around the world face financial pressures that can affect sustainability and patient outcomes, and there is a vast literature devoted to the allocation of scarce health care resources. Capital spending - for example on estates, equipment and information technology - is an important but often neglected area of this literature. This study explores the constraints on the allocation of capital budgets in health care, before addressing the question: what is the role of priority setting and rationing in responses to these constraints? The paper presents findings from interviews conducted with senior finance professionals in 30 National Health Service local provider organisations across England. Findings suggest a pervasive sense of impending crisis, with capital restrictions limiting investment in buildings, infrastructure and equipment. The paper applies a conceptual classification scheme from the classic rationing literature (the forms of rationing framework) and identifies widespread practices of 'selection', 'dilution' and 'delay', with 'denial' and 'termination' comparatively rare. Practices of 'deflection' and 'deterrence' are ascribed to national actors as a means of restricting the flow of capital resources to the system. The study suggests that there is little by way of tailored support for priority setting in capital spending, and a perception that decisions are often reactive and short term. It also suggests that wider system features and dynamics can preclude or constrain priority setting at the organisational level. The authors use these findings to suggest future conceptual development of the forms of rationing framework and make recommendations for research and practice in this area.

1. Introduction

All governments grapple with the challenge of providing health care that is both affordable and of high quality. As a result, tools and approaches associated with evidence based policy decision-making have spread, albeit unevenly, across the world (Chalkidou et al., 2009; Löblová, 2016). Whereas the aspiration for many lower and middle income countries is to extend coverage, so that the costs of care are not borne disproportionately by patients, in countries where universal coverage is assumed, the preoccupation is with improving outcomes, reducing variation and curtailing spending increases (Barasa et al., 2017a; Husøy et al., 2018; Ratcliffe et al., 2017; Williams, 2011). Deciding how to allocate budgets across treatment options and patient groups is commonly referred to as 'priority setting', and such decisions are taken at multiple system levels. The term priority setting is often contrasted with 'rationing' which refers to the effects of limit setting decisions, for example on patients (Klein, 2010). Whereas the reasons for setting priorities are *explicit*, rationing is more likely to be conducted *implicitly* and/or by clinicians at the 'bedside' (Danis et al., 2014). The

priority setting literature is vast, and contains prescription from ethics and economics, as well as analysis from the critical social sciences (Landwehr and Klinnert, 2015; Williams, 2013). Furthermore, priority setting is increasingly present in the national apparatus of health systems, where the rhetoric at least is of promoting equity, clinical effectiveness and efficiency (Baltussen et al., 2017). However, research suggests that local resource allocation processes continue to be marked by high levels of implicit rationing (Crompton et al., 2017; Hall et al., 2018; Robinson et al., 2011).

The sheer volume of policy and research dedicated to priority setting is perhaps not surprising given the problems posed by deficits in health care funding. However, the focus has typically been on services, treatments and therapies, with other areas such as workforce and infrastructure underrepresented (Kuhlmann and Larsen, 2015). For example, spending on equipment is somewhat marginal in the priority setting literature, with even less attention paid to physical infrastructure and information technology (IT) (Diaconu et al., 2017; Reche et al., 2009; Tarricone et al., 2017). We therefore know relatively little about how capital funding decisions are taken, and the extent to which

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priority setting and rationing feature in these. This is problematic, not only because capital budgets constitute a significant element of health care spending, but also because they are often subject to constraint or retrenchment. Furthermore, the capital investment decision-making function itself is often notably under-resourced (Braithwaite, 2018).

This paper explores the constraints on the allocation of capital budgets in health care, before addressing the question: what is the role of priority setting and rationing in responses to these constraints? The relevant elements of the current literature are first summarised and considered in relation to capital spending. We then describe methods and results from an interview study carried out in the English National Health Service (NHS). We use these findings to suggest future development of the forms of rationing framework and to make recommendations for research and practice.

2. Understanding priority setting and rationing

Three broad debates dominate the priority setting and rationing literature. The first concerns the contested claim that rationing is inevitable, and that priority setting is therefore desirable (Light and Hughes, 2001). The second relates to how priority setting *should* be performed, and the third concerns how priority setting – and rationing – take place in reality. Our concern in this paper is primarily with the third of these questions, i.e. whether and in what ways priority setting and rationing are enacted in practice. We give primacy to this question as the inevitability or otherwise of budget limits in health is beyond the scope of this paper to adjudicate. Further, we believe any normative prescription for decision-making should proceed from an empirically-informed understanding of the current experience, and that context is an important mediator of normative prescriptions for decision-making.

Many extant priority setting methodologies promote either decision analysis, stakeholder deliberation or combinations of these two. However, the evidence suggests that the realities of resource allocation often diverge from these rational ideals (Bentley et al., 2018; Gibson et al., 2005; Jansen et al., 2018). The role of contextual factors is central to this discrepancy. For example, system incentives and constraints have been shown consistently to influence the success or failure of priority setting, irrespective of the method adopted (Barasa et al., 2017b; Hipgrave et al., 2014; Petricca et al., 2018; Smith et al., 2016; Williams et al., 2018). In the often highly charged atmosphere of health care limit setting, reactions from the public and stakeholders cannot be inferred from, for example, surveys of social value preferences (Gu et al., 2015). Similarly, official statements of organisation mission and purpose rarely correspond with the unstable and sometimes hostile realities into which priority setting programmes are pitched (Smith et al., 2014). Overall then, analysis of how rationing takes place in practice suggests that institutions, interests and politics retain primacy over evidence, procedural justice, democracy and ethics in shaping processes and outcomes (Harlock et al., 2018; Harris et al., 2017; Williams, 2015).

This discrepancy between the *ought* and the *is* of rationing means that frameworks are required to help interpret resource allocation in practice. We refer to perhaps the most common of these in this paper as the ‘forms of rationing’ (FoR) framework (Scrivens, 1979). This was initially adapted to the health care context by scholars of the NHS in the United Kingdom (Hunter, 1993; Klein et al., 1996; New, 1996). Early versions comprised of four implicit forms of rationing: ‘delay’ in the delivery of care; ‘dilution’ of care quality; ‘deflection’ to other sources of care, and; ‘deterrence’ from accessing services. Descriptions of these forms were initially grounded in the experiences of patients at the coal-face of health care delivery (see Table 1). Subsequently, explicit forms were added, including: ‘denial’ of services, ‘selection’ between interventions and patient groups, and ‘termination’ of provision. These were more frequently expressed as decisions made at system or population levels.

This process of piecemeal development and accrual has resulted in

divergences of presentation, with authors adopting different combinations of forms and defining them in different ways (Hunter, 1993; Owen-Smith et al., 2015; Petrou and Wolstenholme, 2000). As well as this, there is no expectation that the various forms present in similar degree or frequency, as Klein (2010, 389–90) notes:

‘The most visible, and politically sensitive, forms are denial and delay: a refusal to prescribe a particular drug and making patients queue on the waiting list. But the most pervasive form of rationing is the least explicit and least visible: rationing by dilution. Decisions at the coal face of healthcare delivery – not to order an expensive diagnostic test, say, not to make a specialist referral or to reduce ward staffing levels in order to balance the budget – normally attract little attention unless they explode into a scandal.’

Although some validation of the FoR framework can be inferred from the frequency of its application, and the apparently all-encompassing range of its categories, in its current form it is a purely classificatory framework, and therefore unconnected to wider theories of decision-making and welfare. Furthermore, whilst it has been used to describe the rationing of *services and interventions*, it remains to be seen whether it might also be applied to capital spending in areas such as equipment, IT and the built environment. Hypothetically, one might apply the categories of ‘denial’ and ‘selection’ to explicit decisions to refuse or restrict options for capital investment, and ‘termination’ to divestment of physical assets and the services housed within them. Investing in inferior equipment or partial upgrades might be a form of ‘dilution’, and postponing renewal or investment an example of ‘delay’. The forms that capital rationing by ‘deflection’ and ‘deterrence’ might take are less immediately evident but might include diverting clients to capital resources in other sectors, or measures to make capital investment unattractive or unrewarding.

3. Research setting

The English NHS contains a mixed economy of health care providers, which includes traditional NHS ‘Trusts’ alongside ‘Foundation Trusts’ which have greater financial autonomy whilst still being accountable to the NHS. In 2017, these Trusts and Foundation Trusts include 152 acute, 54 mental health, 17 community and 10 ambulance. Many mental health and community trusts have merged into partnership trusts. There are also numerous not-for-profit independent sector providers and thousands of self-employed general practitioners (NHS Confederation, 2017). These providers are ‘commissioned’ by local Clinical Commissioning Groups (n = 207) and national bodies to deliver services for patients. Like systems across the world, the English NHS is facing well-documented challenges as it seeks to reconcile high levels of demand with a limited overall funding allocation (Lafond et al., 2016). Forty three percent of NHS trusts forecast a deficit for the period 2017/18 and there is a recognition across the system that difficult decisions are required over spending in all areas (Murray et al., 2017).

One area affected by these pressures is capital spending, defined here as investment in the acquisition, maintenance or upgrading of physical assets including equipment, technology and buildings. Capital decisions in the English NHS have been subject to increasing national control in recent times as the Department of Health and Social Care (DHSC) has sought to keep within the expenditure envelope allocated to it by Parliament. NHS provider organisations are subject to a capital resource limit and require approval of a ‘business case’ for any new capital project. Although Foundation Trusts can finance capital programmes through internally generated funds, many currently find themselves in financial deficit, which also makes securing loans more difficult. Many organisations are therefore reliant on centrally held funds. However, these have become scarcer as the DHSC has transferred monies from its capital to revenue budgets (Healthcare Financial Management Association, 2018). This has led to claims of a ‘high risk’

Table 1
The seven forms of rationing.

Form	Patient-level definition	System-level definition	Implicit/ explicit
1. Deterrence	Costs which may deter patients from seeking care, e.g. distance, poor information and hostile staff or environment (Harrison and Hunter, 1994).	Similar to patient-level definition but also including broader system policies such as co-payments and demand management.	Implicit
2. Deflection	'Directing would-be beneficiaries to alternatives other than those offered by the health facility, hence saving the resources' (Kapiriri and Martin, 2007, 45).	Policies to deflect demand to other areas of the system, e.g. across health and social care (Petrou and Wolstenholme, 2000).	Implicit
3. Dilution	Reducing standards to cope with demands, 'services are spread thinly to ensure everyone gets something' (Hunter, 1993, 11).	System decisions to lower the quality of services, e.g. reduced time with patients, reduced use of certain tests or employing less qualified staff (Garpenby, 2003).	Implicit
4. Delay	'Discouraging would-be beneficiaries from accessing services through long waiting time' (Kapiriri and Martin, 2007, 45).	As patient-level definition.	Implicit
5. Denial	'Would-be beneficiaries ... are turned away on the grounds that they are not suitable or their needs are not urgent enough' (Klein et al., 1996, 11).	Exclusion of services from the healthcare system or withholding from patient groups (Petrou and Wolstenholme, 2000).	Explicit
6. Selection	'Service providers select those ... would-be beneficiaries who are most likely to benefit from intervention' (Klein et al., 1996, 11).	'choosing among diseases, interventions, technologies, or patients' (Garpenby, 2003, 10).	Explicit
7. Termination	'withdrawal of beneficial treatment from a patient' (Kapiriri and Martin, 2007, 45).	Although not formally defined at system level, Petrou and Wolstenholme (2000, 35) define this as 'the deliberate cessation of care ... without the encouragement to seek further healthcare.'	Implicit or explicit

maintenance backlog of £962.5 million in 2016/17 (Edwards, 2017) and an overall estimated £5bn backlog maintenance bill (Health Foundation, 2017).

The effects of this on local improvement strategies, clinical targets and patient outcomes is unclear. Despite the overall capital funding regime – in which national public funds have become more scarce and local sources of revenue less accessible – local organisations are subject to deficit reduction targets and financial control totals in relation to capital spending, as well as being required to improve and integrate services (NHS England/NHS Improvement, 2018). To meet these targets, they are encouraged to 'maximise opportunities for self-funding of schemes using their own capital and receipts from land disposals and ... private finance where this provides value for money' (NHS England/NHS Improvement 2018, 7). In order to better understand this experience, the primary focus for this study is set at this organisational level.

4. Methods

This study sought to explore the role of priority setting and rationing in provider organisations' responses to constraints placed on their capital budgets. It follows a semi-structured interview-based design to enable open inquiry and follow up questioning in what is a new area of research (Creswell, 2007). This approach facilitates exploration of both the extent and nature of priority setting and rationing, as well as how senior decision-makers understand their role in the resource allocation process (Alvesson, 2003; Kvale, 1996). In this way, we aimed to build appropriate theoretical constructs, identify the locus for possible future naturalistic enquiry (e.g. through case study and observation of decision-making), and contribute to the construction of concepts for future investigation (Eisenhardt, 1989).

4.1. Sampling

Our approach to sampling was guided by the objectives of meeting study aims, and ensuring validity in the content and interpretation of findings (Patton, 2015). Each NHS Trust and Foundation Trust has a board made up of the Chair, non-executive directors and executive directors, of which one will be the Chief Finance Officer (CFO) (or Director of Finance). Typically, the CFO is required to be expert in capital investment appraisal, and oversees the capital programme as well as setting capital and revenue budgets (Healthcare Financial Management Association, 2017). Our target interview population was CFOs in NHS provider organisations, as it was anticipated that these would be best

placed to provide both a reliable account of internal decision-making processes and an appreciation of how national contextual factors shape these. Within the sample, we sought to cover all major regions of England and the main types of NHS provider organisation (including both Foundation and non-Foundation Trusts). At the outset, our provisional aim was to interview CFOs at approximately 20 separate organisations, as this would enable coverage of all organisational categories and regions. After conducting the minimum number of interviews to ensure these points of variation were covered ($n = 12$), we checked for data saturation, setting our 'stopping criteria' at three further interviews with no new substantial themes identified (Francis et al., 2010).

During this process we extended the sample to include CFOs from other organisations (ambulance trusts, a national body, and a Clinical Commissioning Group), and as well as other relevant roles such as 'Chief Operations Officer' and 'Head of Estates.' As saturation checks could not be performed on these sub-sample groups, we treated them as 'exceptional cases' enabling us to challenge and critique interpretations deriving from the wider sample (Gibbs et al., 2007). Our final sample included 30 respondents from 30 separate NHS provider organisations (see Table 2), including 24 male and six female.

Table 2
Sample characteristics of interviewees, by role, organisational type and geography.

Organisation type	Ambulance Trusts (including 1 Foundation Trust)	2
	Community/Partnership Trusts (incl. 2 FT)	9
	Mental Health and Learning Disability Trusts (incl. 3 FT)	5
	Acute Trusts (incl. 10 FT)	12
	Clinical Commissioning Group	1
	National level – integrated care initiative	1
Geographic region	North	6
	Midlands	12
	South	11
	National	1
Role	Chief Finance Officer	20
	Deputy/Assistant/Associate FO	5
	Chief Operations Officer	3
	Head of Estates	1
	Head of Capital Development	1
Total		30

4.2. Data collection

We sent invitation emails to a sample of CFOs across the three regions. Where necessary to fill organisational or geographical gaps, the sample was extended to Deputy and Associate Finance Officers. We sent a reminder email to all non-responders and approximately 200 individuals were invited in total. Of those that responded but declined to take part, nearly all cited lack of available time.

Interviews were semi-structured with pre-set, open-ended questions and probes that the research team modified following piloting with two CFOs drawn from our networks. Questions related to perceptions of and responses to scarcity and the impact of these as well as, where appropriate, to priority setting and rationing in capital spending. Interviews began with general contextualising questions (e.g. role and organisational setting) before moving on to the substantive topic. Interviewees were also encouraged to reflect on their own identities and roles as senior finance professionals.

We obtained ethical approval from the University of Birmingham Research Ethics Committee (ERN_13–1085P), and project meetings involved regular reporting and discussion of ethical issues and challenges, including avoiding harm, informed consent (based on full disclosure of research intent), respecting privacy and anonymity, and relationships between researchers and participants. All respondents received an information sheet explaining the study, and their right to withdraw. All 30 respondents opted for a telephone interview format, which has been found to be acceptable and valid in work-based studies of this kind (Sturges and Hanrahan, 2004). Three members of the research team conducted the interviews, with emphasis placed on building rapport, maintaining flow, and minimising interviewer bias (Shensul et al., 1999). Interviews took place between January and April 2018 and ranged between 18 and 120 min in length (average length 32 min).

4.3. Data analysis

All interviews were audio-recorded with interviewee consent, and data were prepared and anonymised before importation into NVIVO (Version 11). Data were analysed inductively, with initial descriptive codes developed, applied and discussed by the research team following independent coding of a subset of transcripts (Burnard et al., 2008). Codes were then organised into broader themes (i.e. findings of interest and relevance across the dataset), and full coding carried out independently, with checking and matching conducted at the end of this process. The final coding structure and themes enabled us to devise provisional explanatory accounts, which the research team then discussed and revised (Bazeley, 2009). Throughout the analysis process, we looked for negative cases and used these to challenge our developing explanations – for example by giving particular attention to the small number of respondents who reported relatively little constraint on their capital spending. We considered initial explanatory accounts in the light of the literature on scarcity, priority setting and rationing in order to assess the study's wider implications in these fields (Patton, 2015). The following sections present data using summary accounts and illustrative use of quotation (Pratt, 2009).

5. Findings

5.1. Role of the directors of finance

Interviewees described their role in terms of financial stewardship, i.e. ensuring the organisation is 'efficient' and 'productive', meeting financial 'duties' and advising on financial 'probity'. However, many also emphasized the requirement for them to adjudicate between other organisation imperatives including strategic priorities, patient experience, workforce and legal compliance. This sense of 'looking after the basics' whilst also facilitating the organisations strategic plans pervaded responses, and many interviewee sought to dispel the traditional view

of the CFO as someone who 'stops money being spent'. Instead, they described themselves as part of the collective governance of the organisation.

The Finance Director needs to absolutely understand the business and to make the connections between finance, information, and activity, performance. And to really sort of bring it together and be in a position to be able to tell the story about exactly what's going on. (Interviewee 13, Mental Health Trust CFO)

All respondents spoke freely and apparently authoritatively about their recent and planned capital spending programmes. On occasion, respondents requested that specific comments – mainly relating to their interactions with national government bodies – remain unreported. Overall, capital investment was characterised as a neglected domain of strategic planning and resource allocation, which suffered from a lack of professionalization and profile when compared to more directly service-related roles and functions. For example, some interviewees felt that the indirect relationship between capital programmes and measurable clinical outcomes affected the profile and the importance attached to their work.

It's always the poor relation, you know, estates and facilities is absolutely the Cinderella service, and Ambulance Trust estate is even worse because it's not patient-facing so it's often the last thing to be thought about. (Interviewee 30, Ambulance Trust Estates Director)

5.2. Financial pressures

Respondents all agreed that developments at the national level – specifically, perceived barriers to timely release of centrally held funds – had affected the availability of funds for capital programmes.

Those surpluses are not there to allow us to replenish our cash, to continue to invest in capital going forward. And for the foreseeable future, I can't see those surpluses coming back, given the state of NHS funds. (Interviewee 14, Mental Health FT CFO)

Unable to increase revenue-generating activity or secure loans, many had sought alternative means of raising funds or sharing costs, including through: private finance partnerships; leasing; charitable donations, and; asset sales. The majority of respondents, including those organisations in relatively good financial health, had reduced their planning horizons and scaled back capital plans.

What we would like to do is centralise down to one or two sites [but] we just can't do it because we haven't got the money, the capital, to do that. (Interviewee 26, Acute FT CFO)

In interviews, there was a pervasive sense of inevitable and impending crisis, as capital restrictions limited spending on buildings, IT and equipment. This, in turn, was seen as affecting efficiency, improvement, and the range, quality and safety of services. Large-scale transformation plans were seen as particularly difficult to achieve, with major capital works delayed or effectively abandoned in favour of more urgent projects. Almost all respondents stated that efficiency and productivity were compromised by these constraints on capital spending. This manifested in slow or failing equipment, low staff morale and recruitment problems ('people do not want to work in these buildings'), excessive travel times and outdated models of care.

Whilst the most commonly cited impacts resulted from lack of maintenance and renewal of the built environment or lack of investment in equipment, a minority of respondents also cited IT concerns. For example, respondents working within mental health cited the potential for serious quality failures in cases where electronic recording systems were unaligned across inpatient and community settings. One respondent referred to a building as being an 'enormous fire risk' and described relying on regulatory bodies' reluctance to close down medical facilities.

The biggest issue is patient care in our A&E departments, where – if you are going to look at the guidelines - we need much bigger A&E space. There isn't the space to care for patients, and because of that, patients are in corridors frequently ... It is not ideal, we are doing our best to make sure the patients are safe, but that is the impact. And that needs some money spent on it, in terms of changing A&E, which we don't have. (Interviewee 26, Acute FT)

Of the 30 interviewees, 25 reported needing to prioritise and/or ration capital spending. The most frequently cited examples related to equipment and buildings. This took the form of, for example, delays to building renovations and repairs, and postponing of equipment replacement. In the area of IT, examples included inability to invest in appointment scheduling systems and other information platforms.

As we strive to try and achieve financial balance and sustainability, obviously that will then just starve the capital programme, and [we are] really having to take some very tight decisions in what we invest our money in. (Interviewee 13, Mental Health Trust CFO)

My immediate backlog maintenance for the high and significant risks are higher than £1 million, but if I just tackle them I'm still not going to have a fit for purpose estate because just tackling the high and significant risk items doesn't do other things like, you know, windows that are rotten and roofs that are starting to ... It feels like you're constantly playing catch-up. (Interviewee 30, Ambulance Trust Estates Director)

Of the five interviewees that felt their organisations had not yet reached the stage of priority setting and/or rationing, two predicted that they would do so within two-three years. The others highlighted the importance of having been able to maintain a financial surplus and therefore to apply successfully for loans to fund their capital plans.

5.3. The seven forms of rationing

The most frequently cited priority setting and rationing practices corresponded to the categories of *dilution*, *delay* and *selection* from the forms of rationing framework (Fig. 1). For example, interviewees described using depreciation budgets linked to capital assets as a source of savings, thereby *diluting* the efficacy of equipment and weakening the therapeutic environment.

The quality of the facilities for the services deteriorates over time. We don't need to build luxury hotels but we do need places that are conducive to making people feel well and good about themselves. And when people aren't feeling well, to go into something that looks a bit tatty and a bit careworn is not helpful I think. (Interviewee 9, Acute FT CFO)

Many respondents reported *delaying* capital projects, with large-scale transformation plans particularly vulnerable. Interviewees also

identified delay as a strategy of national bodies who were perceived as being unable to meet requests for capital investment funds. Delays in responding to these requests were seen as a cause of postponements – sometimes indefinitely – to local capital projects. These, it was claimed, were passed onto patients in the form of longer waiting times for consultations and tests.

Our interviews suggested that instances of explicit *denial* were comparatively rare, although dependence on inaccessible funds made some schemes practically impossible. More commonly, respondents described processes of *selection* between investment options, with delays (rather than denial) applied to those not selected. Whilst some described these decision-making processes as reactive and ad hoc, others referred to formalised processes and criteria for deciding between options for capital investment.

We have for the last three years been having to identify our core capital requirements. We can't actually afford to replace everything that needs replacing when it's due to be replaced and so we've had to go through a prioritisation process each year and we've done a risk assessment and rag-rated them. (Interviewee 17, Acute FT OD)

Responsibility for priority setting was typically assigned to committees (either temporary or permanent) who conducted appraisals based on business cases, and then fed decisions into the organisational planning process. These bodies were all internally appointed and sat within the organisational structure, albeit with varying relationships to their executive boards and therefore varying levels of decision-making power. The study did not uncover use of any other tools or frameworks, and many respondents cited the difficulties of comparing disparate investment options (e.g. 'car parks and scanners'). In recognition of this incommensurability, some had formally subdivided their capital budget between physical services, IT, major and minor equipment, and prioritised within, rather than between, these categories.

For organisations facing acute financial constraint (the majority of those in the sample), patient safety and protection of service viability were cited as the most influential criteria, with considerations of efficiency, service improvement, strategic partnerships and reducing inequalities, considered secondary.

We go through a prioritisation process ... so we're moving stuff further down the line and prioritising on safety and quality. We do have other things in the decision making process i.e. does it generate income, does it deliver CI [cost improvement], etc. But when our safety and quality is a priority, it means those other schemes are going to the back and because we haven't got any money to even do all the safety and quality ones they're not getting done. (Interviewee 15, Partnership Trust CFO)

Some respondents also cited the challenge posed by vested interests, and there was concern that decision-making overall could be more

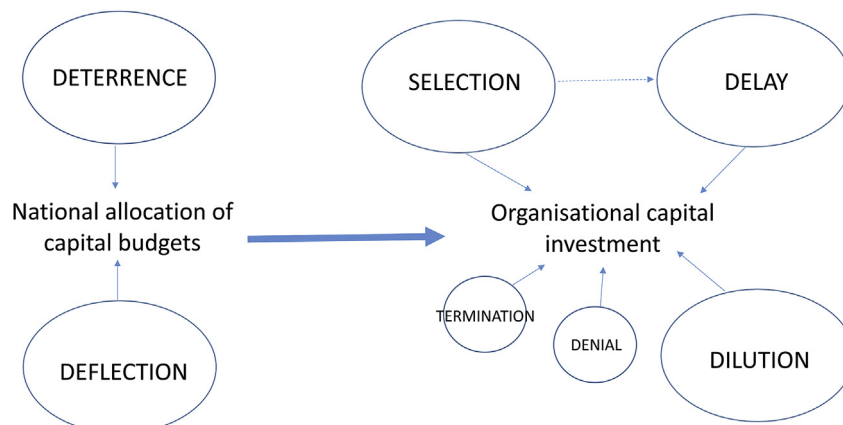


Fig. 1. Forms of rationing in capital expenditure.

robust. These concerns were notably prominent among the small number of non-finance respondents.

It would be fair to say that we have struggled with trying to get an honest appraisal. Clinicians sometimes aren't the best at being balanced about what they need rather than what they want. (Interviewee 29, Acute FT OD)

We tend to make incremental decisions about our estate without thinking what does a five to ten-year plan, or even a 25-year plan, need to look like? ... I think we probably lack capacity and capability to steer the planning around that. (Interviewee 22, Partnership FT OD)

Respondents considered *termination* of services to be rare, citing disincentives deriving both from payment systems ('your cost base goes up and your income goes down'), and public attitudes ('it's more trouble than it's worth most of the time'). As well as being politically hazardous, termination was described, perhaps paradoxically, as resource intensive, with programmes of service rationalisation often not implemented due to short-term pressures on capital budgets.

Although respondents did not report using *deterrence* as a rationing strategy, there was a widely shared perception that changes to national arrangements for accessing capital funds were intended to deter funding applications. These included, for example, new/additional demands for capital programme business cases and extended timelines for their approval or rejection. One respondent, for example described these as a 'deliberate attempt to try and manage the cash position of the Department of Health.'

There were no obvious activities described by interviewees for *deflecting* demand for capital. However, this strategy was again attributed to national bodies who were seen as seeking to deflect capital expenditure plans away from the NHS 'balance sheet' and towards the private sector, in order to stay within their own budget allocation:

It is madness really. The government can borrow at historically low levels but is forcing people down the more expensive private route just to keep it off the books. (Interviewee 7, Acute FT CFO)

6. Discussion and conclusions

Almost all of the interviewees indicated that they were operating in a context of severe constraint. Although some identified other contributors to these problems – including the rapid pace of technological and demographic change and shortages of analytical and planning capability – the primary driver was consistently cited as being the 'starving' of funds for capital projects. Our examination of negative cases (i.e. those not reporting these difficulties) appears to reinforce the central message that funding shortages were a key factor in the problems experienced. In each example, respondents attributed their ability to secure funds for capital projects to their preceding financial good health.

6.1. Priority setting and rationing?

Although most organisations had sought alternative means for raising capital funds, they nevertheless acknowledged the increasing need to ration expenditure. In this respect, the data warrants comparison with the wider literature on priority setting and rationing of health care services. For example, the relative prevalence of delay and dilution appears to reflect approaches long since observed elsewhere (Klein et al., 1996), as does the tendency to avoid explicit denial and/or termination (Robert et al., 2014; Rooshenas et al., 2015). However, some differences were also observable. For example, descriptions of capital resource allocation departed from much of the wider rationing literature inasmuch as they rarely evoked individualised narratives of the patient encounter (with the partial exception of equipment). There was also little reference made, either rhetorical or substantive, to patient

involvement in decision-making processes (Daniels et al., 2018). However, these findings may be a consequence of the narrow respondent sample rather than an inherent characteristic of capital resource allocation.

Although our respondents did allude to some professional and public resistance to capital investment decisions, this appeared to be of a lesser magnitude than is reported in other areas of health care spending. In turn, this appears to suggest a lack of profile vis a vis these other areas, which may result in capital being somewhat disadvantaged in the overall resource allocation process. As something of a neglected area of health care investment (and disinvestment), the risk is that deterioration in capital infrastructure continues for longer before visibility demands a response. This relative lack of profile may explain why some responding organisations were apparently able to adopt an explicit approach to selection, which has proven to be highly contentious in the prioritisation of clinical and therapeutic services (Robinson et al., 2011).

An area of similarity with the extant rationing literature was the apparent reliance on the 'business case' model of priority setting (Robinson et al., 2012). This is perhaps understandable given the under-developed nature of prioritisation methods for capital spending; whilst 'capital-friendly' measurement tools in areas of buildings and construction exist, they are narrow in scope and somewhat untested (e.g. Ali and Hegazy, 2013; Shohet, 2003). There are exceptions, notably in relation to equipment where specific frameworks to support prioritisation have been developed (see for example Diaconu et al., 2017; Ivlev et al., 2014). However, there appeared to be additional obstacles to priority setting for our respondents, including the sheer range and variety of capital investment options, containing degrees of incommensurability far beyond those of more mainstream priority setting. They also include the uncertainty and complexity characterising the relationship between investments and (health) outcomes. Respondents were forced to make decisions based on, at best, highly disaggregated and heterogeneous costs, and poorly understood risks and benefits. It was notable that some respondents had separated capital budgets into sub-units (equipment, IT, buildings) before engaging in option appraisal, and others sought technical expertise drawn from outside of their organisations when weighing up capital investment options (Edwards, 2017).

We set out to examine the role of priority setting in decisions over the allocation of scarce capital resources and, in this respect, our findings have some important implications. Whilst our respondents confirmed the importance of adopting formal priority setting, none believed that this alone would alleviate the problems they faced. Respondents were most concerned with the overall quantum of available capital resources, and saw a simple increase in this as being the single most important requirement for improvement. Allied to this, the NHS funding regime not only placed additional constraints on capital spending, but was also seen as damaging to local decision-making. A common complaint, for example, related to how national budgets were superintended. Many respondents had experienced uncertainty and delay when applying for funds, and this foreshortened their planning horizons in a way inconsistent with priority setting. Some reported failing to secure approval for plans even where the necessary funds were internally available. As well as these direct constraints on their autonomy, national expenditure targets were widely perceived to have impeded local decision-making, as all other concerns were apparently overridden by the imperative to keep major disbursements off the NHS 'balance sheet'. This had also resulted in forms of opportunism in the search for funding which further distorted local priorities – for example deflecting organisations towards non-urgent capital schemes for which resources (e.g. charitable) were more readily available.

The combined effect of these formal strictures and indirect constraints was to diminish the autonomy and control required to implement any priority setting model or process. In these circumstances, it is perhaps unsurprising that *rationing* was preferred to *priority setting* as

the dominant response to scarcity.

6.2. Forms of rationing revisited

As noted, our study appears to confirm the relative dominance of *dilution* and *delay* as mechanisms of rationing, and of *selection* rather than *denial* and *termination* as the preferred approach to priority setting. The FoR model appears to function well in this context in that each of its priority setting/rationing forms was present in the study, albeit these were distributed across local and national actors. Our respondents, for example, ascribed motives of deterrence, deflection and delay to national bodies, and cast themselves as the recipients of the resulting harms. To increase critical purchase, our study therefore suggests that when used to analyse capital budget flows, the FoR model could be simultaneously applied to multiple, interconnecting tiers of decision-making.

It seems likely that the FoR model (as encapsulated in Fig. 1) can be adapted and applied to other areas of priority setting and rationing in health. However, the brevity and heterogeneity that characterises description of the various rationing forms hinders analysis of relationships with, for example, system contexts, and decision outcomes. We therefore believe that observing and recording patterns in the distribution of rationing forms across decision-making tiers may ultimately help to build explanatory models and hypotheses for future empirical testing.

6.3. Limitations and future research

In these ways, we believe this study makes an important contribution to the ongoing theorisation of how rationing unfolds in practice, especially in the neglected field of capital investment. We believe there is value in further application of the forms of rationing model to aid classification and analysis of rationing forms, not just in the arena of capital spending. Given its efficacy in capturing the range of forms in this study, and its wider salience, we propose the following:

1. That the descriptors of the rationing forms be standardised but also variegated according to the tier or level of actor under analysis (Table 1 provides a starting point for this).
2. That the prevalence of each form be tracked, through review of previous research and in attempts to prospectively identify and analyse rationing behaviours in health care.
3. That these behaviours are mapped against wider organisational and system characteristics to enable development of hypotheses as to the presence of the various rationing forms according to observable system features.
4. That attempts are made to connect these configurations to wider theoretical explanations of decision-making and resource allocation in health care systems.

Priority setting and rationing of capital resources in health care is an under-researched topic and the results of this exploratory study, whilst not definitive, suggest some important lines of future empirical research and theoretical development, as well as pointing to issues of some urgency and importance for health care systems. Although our data derive predominantly from the testimony of senior finance personnel in the English NHS, the additional interviews we conducted suggest that different organisational perspectives might enrich understanding. Future research might also take an ethnographic approach to decision-making, and to this end we have identified some of the fora (i.e. capital spending panels and committees, and the business case model of decision-making) where this more naturalistic investigation might take place.

This study also suggests that future research into priority setting and rationing of capital programmes, like all areas of resource allocation decision-making, requires attention to implementation. Although this was not discussed in detail by respondents, the importance of implementation in infrastructural change where organisational

determinants are likely to shape outcomes, is arguably more pronounced (Crompton et al., 2017). Similarly, the issue of patient involvement in capital spending decisions was not raised during the study. However, some of the more intractable problems – such as establishing the relative benefits of options for improving the built environment – clearly require a patient perspective for their resolution (LaVela et al., 2016).

There is a risk of bias deriving from our approach to sampling as well as the level of self-selection it allowed. It was clear from our initial invitation that budget ‘constraint’ formed part of the lens through which we sought to explore the topic, and this may have affected response rates. For example, it may have encouraged those experiencing higher levels of ‘constraint’ to respond, and/or those more willing to disclose the difficulties they were experiencing. The research team’s relative lack of expertise in the intricacies of financial management may also have influenced the research exchange. During interviews, we were conscious of respondents seeking to translate technical terms into more accessible language and, in the process, we may have unconsciously skewed the interactions and our interpretations of them towards the less technical themes associated with the topic. Finally, our study sample is confined primarily to local actors. The absence of a national respondent group means that we are unable to verify motives and behaviours attributed to them during the study.

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